Foreword

BY

SIR PHILIP MORRIS, C.B.E., M.A., LL.D.

Education and training for the healing of the sick is older than most universities and at least as deeply buried in the past as the origins of the university tradition. It was already well established and schools for the purpose had come into existence while the work of the doctor was based almost entirely upon the art and craft of the physician. The methods of medical education were those of apprenticeship and the origins of medical science were a by-product of rather than a foundation for medical practice. Thus when a university movement gained strength and the tendency developed for medical schools to be incorporated in universities they brought with them into the university scene a predominantly professional tradition to meet other schools in the universities which were predominantly academic. They have very largely preserved, even through the rapid changes of the last century, a predominantly professional shape and basis. The medical curriculum has remained a curriculum suitable only for intending doctors and its implicit aim and purpose has been to produce men and women who, having met most of the problems of doctoring, were safe to practise the art of healing.

The predominant authority in the profession and consequently the biggest influence over the medical curriculum and medical qualifications has been the General Medical Council. With its desire fully to safeguard the standards of the profession, it has made recommendations to medical schools which have in fact had almost the force of law. As the scientific basis of medicine has become more extensive and as the foundation of treatment has become more and more the application of scientific discoveries for the improvement of diagnosis and therapy, the curriculum has under these influences become more specialized and more fragmented. As it has seemed necessary to emphasize the development of a speciality by causing and encouraging specialization in consulting practice, so in medical education specialization has been allowed to cause analogous departmentalization both in teaching and in examinations. In a state of affairs in which it is impossible for any able and experienced doctor to be well informed in all the clinical specialities we are still in danger of requiring that the medical student shall at least have some acquaintanceship with all of them. In an understandable desire to ensure that a student is wholly ignorant of nothing a new danger has arisen that he will neither be sufficiently well grounded in anything nor, what is still more important, gain a firm grasp of medical scholarship which will ensure that his education continues as his experience and responsibilities grow.

The need for some fundamental reconsideration of the aim and purpose of the medical curriculum has long been apparent. To undertake such a fundamental reconsideration is now possible because a new policy of the General Medical Council has given to universities a new freedom and with this new freedom the responsibility of thinking out afresh the principles upon which the education of doctors should be based. The first requirement is that the aim and purpose of medical education should be fearlessly examined and re-assessed. The young doctor cannot possibly be taught everything nor can he hope in his undergraduate days to learn everything. The addition to his education of a year of actual experience in hospital under supervision has made it less necessary that the medical curriculum itself should cater for all the professional techniques of day to day importance in medical practice. It is possible for the aim and purpose of the medical curriculum to be more generously defined so that by a re-organization of medical studies the student has both a real opportunity

of finding unity in diversity and also an opportunity to become really well established in at least one important scientific discipline. The layman may suggest but only the profession itself, even in a university, can bring about such a result. The present and the years which lie immediately ahead are the time to do it. Whether the output of medical schools is excessive, as some would have us believe, or not is still a matter for discussion, but it is clear that the education and training of the doctor need not suffer from some of the pressures of expansion which must necessarily affect other university activities. As regards the supply of men and women suitable and fitted to practise medicine, there is for the time being no great problem. Such a state of affairs offers ideal circumstances for fundamental reconsideration followed by progressive re-organization and simplification.

It is fortunate that at such a time Professor C. Bruce Perry should be the President of the Bristol Medico-Chirurgical Society. A beloved consultant of rare experience he has recently had the opportunity of concentrating upon the past, present and future trends of medical education in the United States of America. Of what he has seen there, much of which, as might have been expected, has confirmed what he previously thought, he has made the subject of his Presidential Address. It would indeed be pleasant and agreeable to think that his Presidential Address should at least coincide with, if it does not actually cause, a serious movement towards a reformation in medical education. There is a growing willingness to contemplate changes and perhaps the immediate future may be taken as a good time to devise and introduce some of them.

SOME THOUGHTS OF MEDICAL EDUCATION

Presidential Address delivered to the Bristol Medico-Chirurgical Society 9th October, 1957

BY

C. BRUCE PERRY, M.D., F.R.C.P.

Despite the fact that Sir Robert Hutchinson is said to have referred to Medical Education as "that most boring subject", I have succumbed to the temptation to make it the subject of this address. I have done so for three reasons. Firstly because I have naturally been interested by, and involved in, medical education for many years and some two years ago the trustees of the Rockefeller Foundation gave me the opportunity of spending three months studying Medical Education in the United States. My second reason is that for some time there has been a growing sense of dissatisfaction with our present methods of medical education, which has resulted in a spate of lectures and conferences. In fact, an American observer remarked some years ago that in the past ten years no country has produced so many wise reports on the improvement of medical education as Great Britain, and no country has done so little about it. The third reason that makes me feel that the present moment is a very opportune one at which to consider afresh the whole problem of medical education is the great changes which might have followed the new Medical Act of 1950 and the fact that new recommendations have this year been issued by the General Medical Council.

The Medical Act of 1950 means that no longer does a degree or diploma entitle its holder to practice medicine unless and until he or she has carried out practical work in hospital under supervision for twelve months and such work has been certified as satisfactory.

In an attempt to safeguard the standards of professional competence the General Medical Council has from time to time made recommendations to the Medical Schools that certain subjects should be taught in a certain order for certain minimum periods. It is true that the Council has always taken care to point out that these are only recommendations, but in point of fact they have come to have the force of regulations. Further, their recommendations have been added to with each new issue so that in 1947 the minimum requirements could hardly be completed, if carried out conscientiously, before graduation. Now, however, the policy has been reversed and Universities are being allowed freedom in which to experiment in the nature and content of the medical course.

Education and the Curriculum

The first question which I ask myself is whether we are justified in calling what we give our present students a medical *education* at all. In fact I sometimes wonder when I hear discussions about the need of technical institutes for technological training how soon my colleagues in the other faculties in the University will discern that the medical faculty is little, if at all, better than a technical school and throw us out of the University in disgrace. We were told at our last meeting that in Russia, where after the revolution more doctors were, and still are, required in very large numbers, the medical schools are quite outside the Universities and are now virtually technical colleges.

Charles Newman in his recent review of medical education in the nineteenth century has obviously had similar doubts and has apparently come to the conclusion that about 1900 medical education in this country was replaced by the "medical curriculum".[1]

The first doubts about the efficiency of medical education as we know it to-day were perhaps expressed by Osler[2] who, in 1899, in an address at McGill said: "Undoubtedly the student tries to learn too much and we teachers try to teach him too much—neither

perhaps with great success. The existing evils result by neglect on the part of the teacher, student and examiner of the great fundamental principles laid down by Plato—that education is a lifelong process in which the student can only make a beginning in his college course". However, the first real shock came from the famous report of Abraham Flexner[3] in 1925, which, with the earlier report on medical schools in the United States, did so much for medical education in the United States and probably all over the world. In this report Flexner said, "Medical curricula the world over contain too many subjects as well as too much material. The burden would be heavy enough if it were confined to the larger original units, but within the last fifty years one speciality after another has been split off, erected into a professorship, made a subject of special teaching and finally won a place on the examination list". That was over 30 years ago. Think of the new subjects that have been invented since. He went on to remind us that "men become educated by steeping themselves thoroughly in a few subjects and not by nibbling at many."

Twenty-five years ago, Lord Moran[4] in a paper, aptly entitled "The Student in Irons", wrote "the student caught up in the clinical years in a blind rush to meet the tyranny of signing up, is hurried out of thought. He must be driven into different pens for every hour of the day in the hope that one day he may recognize a disease because he has seen it before, as a sleepy traveller marks his destination by night".

In 1944 the Goodenough Report[5] which spread encouragement and hope through the medical schools of the country restated the need for re-organization of the medical schools and teaching hospitals but prophesied that any such steps would be largely barren of any result unless the present overloading of the curriculum was remedied. The load of work upon undergraduate students, it said, must be lightened by the elimination of all that is redundant or belongs to the province of the specialist. "This reform" it went on, "is so urgent that its accomplishment might well be a condition, to be satisfied before any increase is made in Exchequer grants in aid of undergraduate medical education". As far as I know no university refused increased Exchequer grants, but only one, and that in the last twelve months, has done anything to reduce the content of the medical curriculum. As Osler[6] said, over 40 years ago, "The pity of it all is that we should have made an intolerable burden of the study of one of the most attractive of the professions".

In the face of such criticism how can we claim that our crowded curriculum is a medical education. For to quote Professor Melville Arnott[7] the fundamental object of medical education, indeed of all education, is to develop the human mind as an instrument of observation, deductive and inductive reasoning and rational expression in word and action, whereas in our medical curriculum to-day the tendency is to require the student "to assimilate a series of dicta, without enquiring into their validity or necessarily considering the evidence on which they are based". This is, of course, a feature, as Sir George Pickering[8] has reminded us, which is characteristic of instruction as opposed to education. Pickering goes on, "It is a process which does not necessarily inform the mind of the recipient and may actually do harm by suppressing curiosity, insight and the capacity to learn from experience". Now it is evident that the present overcrowding of the curriculum can have only one result, namely that education gives place to instruction.

Not only has the curriculum become crowded but the length of the course has also been increased. This lengthening of the period of study has extended into the post-graduate years and recently it has been calculated that if the changes which have operated over the past hundred years continue it will, in Boston by 1970, take eighteen years to produce a surgeon.[9] I am not sure that we are not ahead of the United States in this matter as it seems to take nearly as long as that in England now.

How has all this come about?

Medical training starting as an apprenticeship was at first quite unorganized. In fact, before 1800 anyone could practice or write about medicine. (John Wesley, for instance,

wrote a book on *Primitive Physic: or An Easy and Natural Method of Curing Most Diseases*. This was so popular that by 1820 there had been 29 editions. Although written by a cleric, who might be regarded as a "quack", he advised the use of official preparations, as shewn by the last paragraph of the book: "I advise all, in or near London, to buy their medicines at the Apothecaries' Hall. There they are sure to have them good".) However, at the end of the eighteenth century, so-called medical schools sprang up, which were really schools of anatomy and these developed tenuous associations with hospitals in which it was beginning to be the fashion for some of the apprentices to work. It is perhaps this priority which has given anatomy the great influence and prestige which it still has in the medical curriculum. Gradually other studies were included, the first of which was the "Institutes of Medicine" introduced by the famous Boerhaave in 1701 at Leyden.[10] This at first included physics, chemistry, biology and physiology, and to these pathology was later added. Boerhaave really originated the present plan of the medical course divided into pre-clinical and clinical studies, although, of course, in some countries, particularly perhaps in France, there is still no division between the two, the student being introduced to the wards or out-patients from his first day as a medical student.

The medical schools were not in their origin university schools—rather the reverse, as in the provinces most "Redbrick" Universities were developed in association with pre-existing medical schools having associations with the local hospitals and in which the teaching had become organized and supervised as a result of the Medical Act of 1858. Whereas in the case of the London schools they developed and remained part of the hospitals and even now are only gradually being absorbed into the university. During the past 100 years, several factors have contributed to the present appalling state of the curriculum. One is the fact that until the Medical Act of 1950 a degree or licence conferred the right to practice. Hence great anxiety was felt that the curriculum and final examination should ensure that the graduate was "safe" to practice. As each speciality developed, as Flexner said, it fought for its share of the student's time and its place in the final examination. This effect was augmented by the regular appearance of the recommendations of the General Medical Council, to which reference has already been made. Each one of these (until the one issued this year) added further subjects to be studied and usually recommended that previously listed subjects should be studied for a longer time. It is perhaps noteworthy that the only response the General Medical Council made to the plea of the Goodenough Report for a reduction in the curriculum was to increase the detail of its recommendations in nearly every subject. In medicine a requirement for a month's residence in hospital was added, and three subjects, hitherto included in medicine, were exalted into major subjects in their own right with separate departments and examinations.

The result of all this has been that the curriculum has become more and more crowded with compulsory lectures and class work so that the student no longer has any time in which to think about the subjects studied or to pursue individual lines of enquiry.

When Mr. T. F. Edgeworth was a student at the Bristol Medical School (in Old Park) and the Bristol Royal Infirmary in the early 1850's he had to be "signed up" for seven subjects (practical pharmacy, anatomy, physiology, surgery, physic, materia medica and midwifery) in order to enter for the final examinations for the membership of the Royal College of Surgeons. Compare this with our students schedule to-day, in which signatures are required in the clinical part of the course for 25 courses of lectures or demonstrations and 18 clinical appointments.

Need for "free-time"

It is illuminating to compare the time-table of our students in their third year when they have 28 hours of set work a week, with that of a third year science student reading Geology, which occupies 19 hours a week, or that of a third year arts student in the English Honours School, with 10 hours of set work. Yet this overcrowding of the

time-table is not unavoidable as can be seen by considering similar time-tables for students in for instance the Johns Hopkins Medical School where Tuesday and Friday afternoons and the whole of Saturday are "free". In fact in nearly all the thirteen medical schools that I visited in the United States the great importance of "free time" was clearly recognized. In the great experiment at Western Reserve University, where the whole medical course has been re-designed afresh, one of the four great guiding principles which the planners adopted at the start was that every student should have 1½ days a week free.

EFFECTS OF FINAL EXAMINATIONS

Another factor which makes the student try to become a sponge absorbing so-called "facts" is, as Osler realized, the content and nature of our final examinations. We all know that it is impossible for anyone to learn all about medicine or any other branch of the curriculum in 20 years, let alone five, yet the student spends his final years with rapidly increasing anxiety that in his finals he will in fact be asked something he does not know. Thus the rush to complete appointments and get signed up in the fourth and fifth years is replaced in the sixth year by frantic efforts to commit to memory more and more "important" facts. One of the aspects of this, which would be laughable were it not so tragic, is the undoubted fact that many of the "facts" of to-day will be discarded in ten years time. And none of us know which.

What has been the purpose of this final examination which exerts such an influence over the life and behaviour of the student? First of all I suppose it was designed in an attempt to ensure that the newly qualified practitioner would be "safe to let loose on the public". I wonder if it has really ever achieved this.

Pre-registration posts

We all know that for a long time we have always preferred newly qualified practitioners to undertake further training as housemen in hospitals and, or, as assistants in practice before embarking on independent practice. In any case, as I have said, the Medical Act of 1950 should have removed any anxiety on this score. Unfortunately, there is felt in many quarters grave doubts whether the pre-registration year is really functioning as it should. There is no doubt that in many of the recognized posts the pre-registration houseman has far too much to do—some have to look after as many as 80 beds—far too little time and opportunity for furthering his education by reading journals and discussions with his colleagues, and far too little supervision by his chiefs. The difficulty of course is that when the Act was implemented it was assumed that what was needed as a pre-registration post was the old fashioned resident appointment. The hospitals wanted their posts recognized as it was the only way in which they were able to obtain junior medical staff. The universities and licensing bodies were anxious to recognize as many posts as possible as if there were not enough posts recognized then pre-registration practitioners would be out of work through inability to obtain the necessary appointments. (This has happened in some cases). The only way to make this pre-registration year really educational would have been to double the posts in certain first-class hospitals so that the pre-registration officer would be in a stimulating atmosphere and have charge of no more than 20 to 25 beds as the Good-enough Report originally recommended. It is, of course, at the end of this pre-registration year that the practitioner should be declared safe to practice and to this end every licensing body receives a report on the work of the graduates and it is on these reports, if satisfactory, that admission to the Register is recommended. I wonder how many graduates have been required to do more than the minimum two-pre-registration posts because their chiefs and supervisors have not considered them satisfactory.

Are Final Examinations necessary?

To go back to the final examinations. It is claimed that they have maintained standards and this may be so in that since most examiners examine at some time or

another for several examining bodies the final examination is much the same wherever conducted. Another function that has been claimed for the final examination is that it is an important stimulus to work and that it not only makes the student work but influences the subjects he studies. It is well known that students read past examination questions very carefully and thus if a topic figures frequently in examinations it will surely receive a fair amount of attention from the students. It may be true that the students do need a stimulus to make them work but there is little doubt that the present final examinations make them work in the wrong way. Instead of trying to understand a subject the student with the dread of the ordeal of the final examination hanging over him is driven into a frenzied effort to memorize what he hopes will, in the examination, be useful facts. This of course is cramming and not education.

The medical schools of the United States have shown that you can make use of examinations as an incentive to work and yet abolish the final examination as we know it. In the pre-clinical years the American student is subjected to terminal or more frequent examinations to make him work. In the clinical years there may be a *viva voce* or small examination at the end of each phase such as the three months' medical clerking but at the end of each such period his work and progress is carefully considered by all those who have taught him and he is given a "grade". If this is unsatisfactory he is required to repeat this part of the course. But there is no final examination as we know it and the degree of M.D. is given largely on the gradings awarded all through the course. No American student in the clinical years ever thinks of the possibility of failing to graduate. In fact, they all fix up their internships, which are usually held in another hospital from that in which they have been students, months before they are due to graduate. Thus the final months are free from anxiety either, as to graduation, or, as to if and where they will get a house post, and the student can devote his time and energy to real study in any branch of medicine in which he feels particularly interested. In fact he can begin to educate himself.

The final examination and the high fail rate in this examination is one of the features which should show us clearly that all is not well with medical education. How is it really possible to defend a system in which after a very careful selection the picked student is taught for five or six years, at the end of which time on the average about 25 per cent fail to pass the final examination conducted by those who have selected and taught them. (And in some universities the fail rate has in the not very distant past been as high as 40 per cent).

The final examination has recently come under severe criticism from another aspect and it is alleged that in point of fact it is inefficient as a test of the student's knowledge and ability. Professor Bull[11] of Belfast has re-marked some of the orthodox essay type of examination papers after a lapse of time and found that there was considerable variation in the assessment and marking on the two occasions. Criticism such as this has aroused fresh interest in the short factual type of examination question and even in the multiple choice type of examination so popular in the State qualifying examination in the United States where all the candidate has to do is ring a number or underline the correct word. Such examination papers are of course extremely difficult to set but the marking is automatic and can if need be, be performed by an electronic machine.

AMERICAN MEDICAL EDUCATION

I should perhaps explain that while there is no final degree examination in the majority of the medical schools in the United States each individual state has its own requirements for registration for practice and most require the candidate to sit a fairly simple examination. This is usually taken near the end of the compulsory twelve months' internship which roughly corresponds with our pre-registration year. It seems to be rare for any ordinary candidate to fail.

Students and Staff

There is another striking difference between the medical schools of the United

States and Great Britain and that is that staff/student relationship. In the States the student is in no fear or awe of his teacher and is encouraged to discuss cases and problems freely with him. There are no strange delusions about the infallibility of professors for in the grand rounds and conferences which are held daily the student may present the case, but he then hears it discussed fully by all members of the staff and even by his student colleagues and he rapidly learns that there are many different view points on the majority of problems.

Students' responsibility for patients

This leads me to another matter which sometimes causes me concern and that is that our students seem no longer to have any sense of responsibility for the study or care of their patients. Twenty years ago the medical clerk was made to feel that he was an essential member of the team caring for the patient. This sense of responsibility was of course a great spur and stimulus to him. Certainly since the war this has largely disappeared. I do not think it is because of the increased number of junior staff, such as registrars and the like, since in the States the staff in a teaching hospital is far greater than anything we have ever dreamt of. It may, I think, be due to the fact that as part of their training we now require the residents to write notes on the patients, and the students feel that their own note taking is therefore superfluous and a waste of time. In the States the student responsibility is carried to great lengths. In some out-patient departments the patient is first seen by a student, who has his own consulting room with his name (Dr. Smith) on the door. He spends 1½ to 2 hours with the patient taking a full history, making a complete clinical examination and any pathological studies he thinks indicated and then presents the "worked up" case to his teacher. Then follows a consultation on the diagnosis, any further studies that might help, and treatment. The student then arranges the further study or prescribes the treatment. Of course, few of the cases in the out-patient department are referred and out-patients are only to a slight extent consultative.

Organization of Teaching

The free participation by the student in the discussion of a patient is facilitated by the organization of the teaching. For years we in Great Britain have been told that in order to impress the student with the importance of, say, pathology or preventive medicine these subjects must be taught throughout the course. We have tried to do this and have spread the formal teaching over perhaps three years. The result is that when the clinical clerk in the fourth year meets a patient with mitral stenosis he has no idea of what this is, or what it looks like, because he is going to be taught about the pathology of heart disease next year. So, too, in order to make the student continually work at pharmacology, we put the examinations in pharmacology as late in the course as we dare, with the result that when in the fifth year the student is doing obstetrics and should in the evenings be reading about the various types of labour, instead, so great is his anxiety about the examination next month he spends all his time learning about the pharmacology of hexamethonium. By contrast, in the States the teaching in pre-clinical subjects is often arranged in "blocks" so that for say, ten weeks the whole time is devoted to pathology which is then completed. As a result, when the student meets his first case as a clinical clerk, he may never have handled a patient before but he knows theoretically all about the aetiology and pathology of the disease and about the pharmacology of the drugs that may be used and has had instruction in the symptoms and signs. It is clear therefore why he is able to discuss the case with his teacher intelligently.

Another aspect of medical education which has received great attention in the United States is the problem of "integration". I have already mentioned how our students may hear about the pathology of a disease one year and the aetiology next year and so on. Is it possible or desirable so to organize the course that on the day he first hears about suppuration the student also learns about the staphylococcus, sees a patient with

a boil and learns about the surgical technique of opening it and the pharmacology and methods of administration of penicillin. It is possible but clearly the organization necessary to achieve such as an arrangement as I have outlined makes enormous demands on teacher time and this has to be repeated every day. It has been suggested that it is not only difficult but undesirable and that the best place for integration to take place is in the student's own mind. On the whole I rather agree with this view. However, it has one great dvantage and that is that the barriers between departments are broken down. All teachers must know when and how their colleagues are teaching their subject. At Western Reserve which, as I have already mentioned, has designed a new medical course, integration has been one of the main principles. As a result, there are no departmental class rooms or laboratories. There is a laboratory class room for each year where every student has his own desk, laboratory bench and cupboard and where he can work at any time of the day or night. The department and the teacher come to the student who occupies his own desk whether he is at a bacteriology lecture or a practical physiology class. The course is so designed that at the same time that the student is taught about the anatomy—gross and microscopic—of the liver, he learns about its physiology, the pathological changes that may affect it, and the clinical features of the disease so produced. But in order to achieve this a special grant from the Commonwealth foundation was necessary so that the teaching staff could be enormously increased. Even now the teachers have to spend much time in conferences planning the timing of the instruction. It is a fascinating experiment but one I feel which does not justify the cost.

Functions of a University

Up to date I have failed in my efforts to make my students discuss cases and argue with me in the way the American student does. Yet surely this is the essential basis of true education and the main object of a University: described by Sir Edward Appleton[12] in his Reith Lectures as "a place of intellectual roads and bridges: it provides the student with opportunities for contact with other minds and other disciplines". Sir Clifford Allbutt[13] once stated that the function of a University "is not qualification for the practice of any art or trade, but is a training of the mind, a formation of habits of study, of insight, of easy handling of ideas and of methodical research . . ."

In the paper on the "Student in Irons" to which I have already referred, Lord Moran said of English medical training: "The one purpose of the student's years is, it seems, not to train and test habits of thought but to collect and store a set of facts, as squirrels hoard the nuts on which they hibernate. These facts are his capital . . . Presently it shrinks and he must needs replace it by a store of wordly wisdom built upon a growing discernment of the ways of human nature, so that soon he is as cunning in the management of men as he is helpless in the control of their diseases . . . The little he knows is soon antiquated, and he cannot keep up with a rapidly changing science, for we have so contrived to educate him that he cannot educate himself".

We all hope that this is an exaggeration but we all also know in our hearts that there is an unpleasantly large element of truth in it.

We must recognize that medicine is indeed a rapidly changing science. Further a medical graduate now has open to him a widely varied choice of work. He can become a medical administrator, an expert in preventive medicine, a pure research worker, a teacher in the basic sciences, a laboratory worker, a consultant, a specialist in an ever narrowing clinical field or a general practitioner. Once upon a time nearly every medical graduate practiced more or less as a general practitioner looking after individual patients. Now probably less than half the medical graduates ultimately work in general practice. What is the sense in trying to ensure that all these people are "safe to practice"? Surely we should realize the position and our aim should be to graduate men and women with the essential basic background, imbued with the spirit of study and so educated that they will go on learning by themselves, whatever branch they take up and remain students all their lives. To borrow the zoological metaphor used

by Professor Harris[14] at the last Home Universities Conference, we should try to turn out totipotential free swimming larvae capable of independent existence and development, with no further formal instruction, into any and every type of medical man.

Teachers of Medicine

You will have noticed that up to now I have not discussed the question of the teacher or the taught. The selection of medical students is an extremely difficult one, but as on graduation there is such a wide range of openings available to the medical graduate it seems to me that we should accept a wide variety of types of student and accept them for varying reasons. The things that are essential are good intellectual equipment and a capacity for and willingness to perform hard work. Whilst there has, ever since the war, been a very rigorous selection of medical students, there has, as far as I know, never been any selection of medical teachers—at least on the clinical side—on the basis of their ability to teach. In fact this seems often to have been the last thing that was considered when most of us were appointed. We were appointed to the teaching hospital, I think, mainly because it was hoped that we would make good physicians or surgeons and to a lesser extent because we had turned out a modicum of original work.

It is, of course, extremely difficult to know what makes a good teacher and I am not at all sure that the student is necessarily the best judge of that. Under our present system the average student rates highest the teacher who can concisely give him ten causes of ascites. But to me this is the very worst sort of teaching which stifles thought and encourages blind memorization. In some of the schools I visited in the United States I found that the head of the department of medicine received from every student at the end of every term an appraisal of his teachers. If any one teacher consistently received bad reports from the students he was warned and if the bad reports persisted he was not asked to teach next year.

At Illinois medical school lectures have recently been attended not only by students but also by staff colleagues of the lecturer[15] both of whom have recorded their opinion of the lecturer. There was quite a difference in some cases between staff and student assessment. (Incidentally in this study 80 per cent of the students stated that they considered lectures a waste of time.)

You will have seen from what I have said already that I do not think the teacher as a teacher very important. If the essential thing is for us to teach the student to learn for himself then the teacher's main function is to make opportunities and to stimulate interest and enquiry.

I must apologize if I have told you at some length about my impressions of medical education as I saw it in the United States, but it was a stimulating experience. I do not want you to go away thinking that in my view everything is right in American medical education but I do think that we have much to learn from it. I did come to the conclusion that however short the American medical graduate may be in his store of facts as compared with his British counterpart on graduation he is a far more exciting person to meet and talk to and is far more alive to the growing parts of medical knowledge and to the ways in which medicine may develop. He has learnt to learn.

To quote Osler[6] once more:

"The conclusion of the matter is the student needs more time for quiet study, fewer classes, fewer lectures, and, above all, the incubus of examinations should be lifted from his soul. To replace the Chinese by the Greek spirit would enable him to seek knowledge for itself, without thought of the end, tested and taught day by day, the pupil and teacher working together on the same lines, only one a little ahead of the other. This is the ideal to which we should move."

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THE MEDICAL LIBRARY OF THE UNIVERSITY OF BRISTOL

BY

A. E. S. ROBERTS

The Medical Library of the University of Bristol is to-day a concentration of all the medical libraries that have been formed in Bristol during the last two centuries. Several of these old libraries were personal collections built up by book lovers and experts in their professional field, and contained many rare and first-class works. This explains how we come to possess such a magnificent collection of the classics of medicine and of early printed books. This combined collection has been in existence since 1893 when the library of the Bristol Medico-Chirurgical Society first became part of the Medical School Library; and to-day the number of volumes in the library has grown to nearly 40,000 and the current periodicals number some 450.

The library of the Bristol Medico-Chirurgical Society was established in 1890 and was formally opened on 5th January, 1891, by the President of the Society, Mr. Samuel Henry Swayne (1820–1900), as a Medical Reading Room and Reference Library in accommodation provided by the Literary and Philosophic Club at 22 Berkeley Square. A start was made with over a thousand volumes (including a large donation from the British Medical Association), and seventy-nine current periodicals, and it quickly grew as the result of gifts from individuals, grants from the Society and review books and exchange journals through the *Bristol Medico-Chirurgical Journal*. At this time the Medical School had no library for its Staff, and did not provide books for either its teachers or its students, so the Society agreed with the University College to form a joint library, and on 1st July, 1893, the Society's library was transferred to the new Medical School buildings.

The library was now housed in a room magnificent in its proportions and decorations, but strangely inadequate for its growth, although it had been specially designed for the purpose. The walls on three sides of the room were occupied for about three-quarters of their height by windows, which, though very beautiful in themselves, considerably lessened the wall-space available for book-shelves and it soon became necessary to erect shelves against the greater part of these windows.

This joint library was known as the Bristol Medical Library and its affairs were controlled by a committee of three members from the Society and three from University College.

The next collections to be added to the Bristol Medical Library were those belonging to the Infirmary and the General Hospital. This incorporation took place in 1894, mainly through the influence and energy of James Greig Smith (1834–1897). The Infirmary Library had been established in 1826 by initial gifts of books by Richard Smith (1772–1843) and Richard Lowe (died 1850). It was not until 1838, however, that a library committee was formed which at its first meeting drew up some library rules. These rules stated that all Infirmary students and pupils could have access to the library and could take out books. The House Surgeon was put in charge of the library and he was authorised to appoint one of the assistant pupils as "Acting Librarian". In the remarks column of the 1855 catalogue of the Infirmary Library (which may still be at the Infirmary) borrowers who refused to return books at the request of the Acting Librarian had written facetiously against the missing books such remarks as "Sold to buy gin", "Deuced odd", "Popped at Chilcott's", "humbug". There is a printed catalogue in the Medical Library of the contents of the Infirmary Library which shows what a magnificent library it was, being particularly rich in eighteenth-century books.

Soon a further collection of books was presented—by the City authorities. This

particular library had had a rather chequered history. It was originally called the Bristol Medical Library when it was founded as a subscription library by Edward Kentish and others in 1832. It was housed in a building in Orchard Street, leased from the Corporation at a yearly rental of two pounds. The library remained there until 1856 when it was transferred to the custody of the Bristol Library, another and older subscription library founded in 1772, which had just moved from King Street to the west wing of the Bishop's College which then stood on ground afterwards occupied by the Art Gallery. The Bishop's College ceased to exist in 1861 and the property passed to the ownership of the Bristol Rifles Headquarters Company, but the libraries were able to remain there till 1871, when they were moved to the Museum and Library in Queen's Road. The Museum and Library did not receive the public support that was expected and in 1893, through the generosity of the shareholders and the liberality of Sir Charles Wathen (1832–1893), a former Mayor, who undertook the payment of all outstanding liabilities, it passed to the ownership of the City. Soon afterwards the City authorities handed over to the Medical School the medical portion of the library which, of course, contained many of the books from the old Orchard Street collection.

The latest addition to the Medical Library of the University came from the Royal United Hospital, Bath, in 1950. This was a collection of medical libraries gathered together by Bath medical men, mainly by Caleb Hillier Parry (1755–1822) and John Smith Soden (1780–1863) but it had not been added to for many years. The Parry part has a separate manuscript sheaf catalogue and these books are kept together as the "Parry Collection", while the others have been absorbed into the general arrangement of the Medical Library. Though some of the volumes are in poor condition, the collection is rich in rarities and old classics.

Of all these libraries, only the library of the Bristol Medico-Chirurgical Society is still alive. The *Bristol Medico-Chirurgical Journal* (now renamed the *Medical Journal of the South-West*) plays a large part in the growth of the library, for all books reviewed in the *Journal* and all periodicals received in exchange are placed in the library. In 1948 the *Journal* ceased to publish book reviews because the price of printing was too high, and so review books are no longer received in the library, but the Society, to cover this loss of review books, makes an annual grant to the library. Exchange periodicals still come to the library; these include some out-of-the-way items, and while the library would not purchase all of them if they were not received free, some of them nevertheless form a valued part of the library in these days of extensive library co-operation, because they are possessed by very few of the other libraries in the country.

The library was moved again in 1912 because the University required the library room for a Council Chamber. Accommodation was provided in the east wing of the Blind Asylum, but here the library's stay was short, for in 1915 the building had to be pulled down to make way for a new University library and administrative block, and it was necessary once more to find other quarters for the Medical Library. This was arranged in the old Drill Hall, the entrance to which was from University Road. It was not thought the Medical Library would remain here for long but in fact the library part of the new building was not ready for occupancy until 1923 in which year the medical books were transferred to their present home. An extension of the library wing of this block was completed by 1940, although it was not used for library purposes till after World War II in 1945. The Medical Library's share of this extension is used as a stackroom.

L. M. Griffiths (1845–1924), the first Honorary Librarian of the Bristol Medico-Chirurgical Society, was succeeded in 1902 by C. King Rudge (1846–1926), and after him there followed W. Alexander Smith, George Parker and A. Rendle Short. Between 1938 and 1950 no Honorary Librarian was appointed by the Society but the Professors of Medicine, Surgery and Obstetrics were asked to act in that capacity. The present Honorary Librarian is Dr. H. J. Orr-Ewing.

From 1912 to 1922 the Medical Library staff, although appointed by the University,

was under the orders of the Honorary Medical Librarian, and the library was managed by a committee of ten members, five appointed by the University and five by the Society. On 21st June, 1922, the Society, at a special meeting, unanimously passed a resolution to make an absolute gift of its library to the University, subject to conditions which would ensure members of the Society, present and future, enjoying full privileges of the library. A new agreement was completed on 9th December, 1925, between the Society and the University which provided, among other things, "That the Medical Library shall be under the ultimate control of the Librarian of the University who shall be responsible to the Library Committee of the University. That the general management of the University Medical Library shall be vested in the University Council who may delegate to the Library Committee power to make and alter Regulations for using the same. There shall be a special Sub-Committee of the Library Committee to be known as the "Medical Library Sub-Committee", which shall report directly and be responsible to the Library Committee. That the constitution of the Medical Library Sub-Committee shall be as follows:—"The Chairman of the Library Committee, the Librarian, the Dean and one other representative of the Faculty of Medicine, two representatives of the Society and the Honorary Medical Librarian who shall be appointed by the Society". "The office of the Honorary Medical Librarian shall carry no administrative authority, but shall be of an advisory character only".

To-day in 1957, we are contemplating a future move of the Medical Library to the new Medical School, even though the building has not yet progressed beyond the architect's drawing board.

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CARCINOMA OF THE THYROID

A Review of 100 Cases

BY

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INCIDENCE

Carcinoma of the thyroid is uncommon. In the South-West Region it accounts for only 0·69 per cent of all cancer, (excluding that of the skin). This compares with 0·4 per cent of a total of some 447,000 deaths from cancer (excluding the skin) notified in this country between 1951 and 1955.[1] In the Bristol Royal Infirmary since 1950, 1,096 patients with enlarged thyroids have been seen, and of these, 28 were malignant, an incidence of 2·5 per cent.

This paper reviews 100 cases of carcinoma of the thyroid occurring in the South-West Region of England. Half of these patients attended the Bristol Royal Infirmary in the first instance, the others were referred to the radiotherapy department at the Bristol General Hospital, having first been treated at other hospitals in the region. In this series there are 80 female and 20 male patients, a ratio of 4 to 1. Up to the age of 64, the ratio is 3·3 females to one male, whilst over 64, there were 31 females and only 5 males. The preponderance of females is peculiar, as the usual ratio is 2 females to 1 male. This anomaly is partly explained by the fact that only 5 of our patients were under the age of 40. In a recent report by Alhadeff *et al.*[2] from the Post-Graduate School at Hammersmith, one quarter of their patients were under 40 years of age, and in this age group the sex incidence was equal.

Nearly 40 per cent of cases occurred in the 55–64 age group, the youngest patient was 25, and the oldest 88 (Table 1).

TABLE I

AGE AND SEX INCIDENCE OF 100 CASES OF CARCINOMA OF THE THYROID

Age	Males	Females	Total
25–34 ..	1	2	3
35–44 ..	2	8	10
45–54 ..	2	11	13
55–64 ..	10	28	38
65–74 ..	3	21	24
75–84 ..	2	9	11
85–94 ..	0	1	1
Total ..	20	80	100

PRE-EXISTING GOITRES

It was widely believed that in most patients, thyroid carcinoma was preceded by adenomatous goitre. Cade[3] from 20 different papers on the subject, determined the average figure to be 71 per cent. In recent years however, clinicians have not supported this belief, and Alhadeff, Scott and Selwyn Taylor,[2] state that pre-existing goitre was present in only one-third of their cases.

If we define, as have these authors, a pre-existing goitre as a symptomless thyroid swelling present for more than 10 years, then only one-quarter of the patients in the present series fulfilled this criterion. In fact the length of history of a goitre in many patients was surprisingly short, one-third presented with a history of 3 months or less, and half with a history of up to 1 year.

This discrepancy in figures for the incidence of pre-existing goitre is probably due to 3 factors. First, the criterion for the length of time an enlarged thyroid must be present, to be classed as a pre-existing goitre, may vary from series to series. Secondly, in series from those areas where endemic goitre is common, there will be a higher percentage of cases with previous thyroid swelling. Lastly, Crile[4] has suggested that the slow rate of growth of the papillary type of cancer has given rise to the belief that the cancer arises in a pre-existing benign nodule. In this series, however, most of the cases of cancer arising in pre-existing goitre, have been of follicular type. The papillary type has appeared *de novo* with a history of 1–3 years. The anaplastic type has arisen in pre-existing goitres and *de novo* in equal proportions.

MODES OF PRESENTATION

The modes of presentation of 78 of the best documented patients in this series have been analysed. Six clinical patterns are apparent (Table II).

TABLE II

AGE AND MODE OF PRESENTATION
OF 78 CASES OF CARCINOMA OF THE THYROID

Age	Lump in neck present less than $\frac{6}{12}$	Lump in neck present $\frac{7}{12}$–3 years	Recent enlargement of pre-existing goitre	Difficulty in breathing	Thyrotoxicosis	Metastatic lesions	Total
25–34	0	0	0	0	0	1	1
35–44	3	5	0	0	0	0	8
45–54	2	3	2	0	0	1	8
55–64	10	8	6	3	1	2	30
65–74	10	2	2	4	1	2	21
75–84	3	2	1	3	0	0	9
85–94	0	0	1	0	0	0	1
Total	28	20	12	10	2	6	78

1. *Lump present less than six months.* In this group, 28 patients, or over one-third of the total, mainly in the 55–64 age group, complained of a lump in the neck present for 6 months or less. In other words, they had a fairly rapidly enlarging thyroid swelling. In 5 patients with no other symptoms, 2 were diagnosed as having benign lesions, and in the other 3 a diagnosis of possible carcinoma was made. In most of the remainder, however, other symptoms occurred, the commonest being dyspnoea, followed by hoarseness, dysphagia, and occasionally pain in the distribution of the 2nd and 3rd cervical nerves. On examination the thyroid was enlarged unilaterally or bilaterally in equal numbers. Pathological examination revealed follicular carcinoma or anaplastic tumour in most cases. Eleven of the 28 cases died within 3 months, and only 8 survived for more than 2 years.

2. *Lump present for longer than six months.* Twenty patients, or about one-quarter of the total, presented with a lump in the neck which had been present for 1 to 3 years that is, with a relatively slowly growing tumour. Patients in this group were a decade younger than those in the first group.

On examination 15 had unilateral enlargement of the gland, and 5 had enlargement of both lobes. Eight patients with unilateral enlargement are still alive, 5 of these had papillary carcinoma and all 5 have survived for more than 2 years after treatment. Of the 5 patients with bilateral enlargement 3 had anaplastic tumours and died within 6 months, the other 2 with papillary carcinoma are alive 3 and 4 years after treatment.

3. *Recent enlargement of pre-existing goitre.* In this group 12 patients, about one-sixth of the total mainly in the 55–64 age group, presented with recent enlargement of a pre-existing goitre.

The swelling was associated with dyspnoea, hoarseness and dysphagia in half the cases. In this group also, the diagnosis was not always definite, being classed as nodular goitre twice, and twice as "possible carcinoma". On examination, unilateral or bilateral goitre was found, in equal proportions. The thyroid was large, and hard on palpation. Pathological examination revealed follicular carcinoma in the majority. Six of these 12 patients are still alive up to 3 years after treatment.

4. *Difficulty in breathing.* Ten patients presented with a primary complaint of difficulty in breathing associated with thyroid swelling. One-half of these patients gave a history of long standing goitre, whilst in the remaining 5 there was a very short history of thyroid enlargement. On examination the glands were diffusely enlarged, hard, and in many cases, fixed. Breathlessness was so severe that emergency tracheostomy was performed. Six of these 10 patients were dead in 3 months, and 3 more within 6 months.

5. Two patients presented with symptoms and signs of thyrotoxicosis. The first, a female aged 67, underwent sub-total thyroidectomy. Papillary carcinoma was found on histological examination, and she is well two years after treatment. The second patient, a female aged 59, is free from recurrence or metastases four years after sub-total thyroidectomy. Follicular carcinoma was found on histological examination. Two other patients had a thyroidectomy carried out for thyrotoxicosis 9 and 10 years before presenting with carcinoma of the thyroid.

6. The final group of 6 patients presented with metastatic lesions. Five of these, all over 50 years and all females presented with osseous deposits.

The varied clinical picture in this group is shown in the following case histories.

CASE 1

A female aged 54 presented with a 2-week history of swelling of the manubrium sterni, associated with pain, cough and breathlessness. One year previously a rib had been removed for a tumour, and thyroidectomy had been done ten years before. On examination there was a pulsatile swelling of the manubrium 4 cm. in diameter. Radio-active iodine uptake was high over the tumour, so a therapeutic dose was given. The mass completely disappeared within fourteen days. Histological examination of the rib tumour showed it to be a metatasis from carcinoma of the thyroid.

CASE 2

A female aged 59 presented with aching pain in the back followed shortly by paraplegia. X-ray showed a secondary deposit in the tenth dorsal vertebra. The patient had had a swelling in the right side of her neck all her life, from which a biopsy was taken, which showed carcinoma of the thyroid. She died within four months.

CASE 3

A female aged 60 consulted an orthopaedic surgeon about a pain in the leg, a metastatic deposit was found in the second lumbar vertebra on X-ray, and later one appeared in the cervical spine. A swelling in the neck had been present for years. Sub-total thyroidectomy was carried out and histological examination revealed carcinoma of the thyroid. The remainder of the gland was destroyed by radioactive iodine, and later, a tracer dose revealed functioning metastases. These metastases have been held in check by radioactive iodine for 5 years, the patient being still alive.

CASE 4

A female aged 72 complained of a lump in the clavicle which had been gradually enlarging for 3 years.

Ten years previously, thyroidectomy had been carried out for nodular goitre. There was

no uptake of radioactive iodine. On examination, the swelling, 5 cm. in diameter, showed expansile pulsation. It was excised, and shown to be a metastasis from thyroid carcinoma.

CASE 5

A female aged 73 presented with a pathological fracture of the femur, and a large goitre. Biopsy of the neck swelling revealed carcinoma of the thyroid.

The only male patient in this group presented at the age of 25, with enlarged cervical lymph glands, which were at first diagnosed as being tuberculous.

DIAGNOSIS

The diagnosis of carcinoma of the thyroid in its early stages has given rise to difficulty. Two patients, clinically diagnosed as having benign goitre, were found to have a malignant thyroid at operation. Nine patients, diagnosed as having a benign goitre clinically and at operation, were found to have carcinoma on histological examination. It is interesting that it is this group of patients with the wrong diagnosis that has the best prognosis (Table III).

Single Nodules. Five patients had an enlarged single nodule, thought to be innocent, until histological examination revealed a papillary carcinoma. The difficulty in diagnosis in these single nodules is well recognized. "Whether removal is urged because the nodule may become malignant, or because it is believed to be malignant from the start, most surgeons agree on immediate operation", (*Lancet*),[5] or to quote Lahey[6] "No discrete adenoma is too small to degenerate malignantly. The size of the thyroid tumour is no guarantee against the danger of its being malignant".

Nodular Goitres. At least 6 patients were diagnosed clinically as having benign nodular goitre. It is this type of case which presents the most difficult problem in diagnosis, for a history and clinical examination are no different from benign nodular goitre. Errors seem to be inevitable. One solution would appear to be to operate on all nodular goitres. This, however, is impracticable, as it has been estimated that one-quarter of a million thyroidectomies would have to be carried out in this country, (*Lancet*).[5] Moreover, in only one-quarter of the patients in this series did carcinoma arise in pre-existing goitre, so that this vast number of operations would have to be done to prevent only one-quarter of the cases of cancer of the thyroid. Again, even in endemic areas palpable nodular goitres represent only a small fraction of all the thyroids that actually contain nodules, (*Lancet*).[5] Crile[4] sums up the problem by stating that a woman would be better protected against a fatal cancer by removal of a normal breast or cervix, than by partial removal of a nodular goitre.

The diagnosis of carcinoma of the thyroid is not difficult in the later stages of the disease when patients present with a large hard mass in the neck, dyspnoea, dysphagia, recurrent laryngeal nerve paralysis, or pain due to involvement of the second and third cervical nerves. The disease at this stage may be mimicked, however, by other lesions for example, infiltration by carcinoma of the oesophagus, bronchus, larynx, or breast, or by Riedel's thyroiditis, or Hashimoto's disease.

The following cases in which a diagnosis of carcinoma of the thyroid was made on clinical examination, are illustrative.

CASE 6

A female patient aged 61 who had had a radical mastectomy 5 years previously, presented with a hard fixed swelling involving both lobes of the thyroid glands in both sides of the neck and left axilla. Biopsy showed spheroidal cell carcinoma of scirrhous type. At post-mortem neither lobe of the thyroid was recognizable. Trachea, larynx and oesophagus were embedded in dense malignant tissue, consistent with spread from carcinoma of the breast.

CASE 7

A female patient aged 40 presented with increasing dysphagia and rapidly enlarging goitre. On examination there was a large swelling in the neck. At post-mortem a primary carcinoma of oesophagus was found with diffuse malignant infiltration of thyroid.

TABLE III

RESULTS OF TREATMENT OF 100 CASES OF CARCINOMA OF THE THYROID

Number of cases	Clinical Diagnosis	Operative Diagnosis	Treatment	High voltage X-ray therapy	Number of patients alive	Shortest survival	Longest survival	Average survival
5	Single nodule, cyst or adenoma	Adenoma	Excision of adenoma	3	5	$\frac{6}{12}$	$6\frac{3}{12}$	$2\frac{7}{12}$
2	Carcinoma	Carcinoma	Total thyroidectomy	2	0	$\frac{5}{12}$	$4\frac{10}{12}$	$2\frac{7}{12}$
1	Nodular Goitre	Carcinoma	Attempted total thyroidectomy	0	1	—	—	$1\frac{8}{12}$
1	Possible Carcinoma	Carcinoma	,, ,,	1	1	—	—	4
3	Carcinoma	Carcinoma	,, ,,	3	1	$\frac{1}{12}$	$1\frac{7}{12}$	$\frac{8}{12}$
4	Nodular Goitre	Nodular Goitre	Sub-total thyroidectomy	4	3	$2\frac{3}{12}$	5	$3\frac{7}{12}$
5	Possible Carcinoma	Carcinoma	,, ,,	4	5	$\frac{7}{12}$	$2\frac{8}{12}$	$2\frac{1}{12}$
6	Carcinoma	Carcinoma	,, ,,	5	0	$\frac{3}{12}$	$\frac{6}{12}$	$\frac{4}{12}$
8	No record of clinical diagnosis	Carcinoma	,, ,,	8	4	$\frac{9}{12}$	$4\frac{7}{12}$	$2\frac{8}{12}$
1	Nodular Goitre	Carcinoma	Hemi-thyroidectomy	1	1	—	—	$4\frac{7}{12}$
3	Carcinoma	Carcinoma	,, ,,	3	0	$\frac{4}{12}$	1	$\frac{8}{12}$
5	No record of clinical diagnosis	Carcinoma	,, ,,	4	2	$2\frac{8}{12}$	$6\frac{3}{12}$	$4\frac{8}{12}$
3	Carcinoma	Carcinoma	Hemi-thyroidectomy and block dissection	2	2	$1\frac{5}{12}$	$6\frac{7}{12}$	$2\frac{9}{12}$
4	Carcinoma	Carcinoma	Partial removal for obstruction	4	0	$\frac{3}{12}$	$1\frac{6}{12}$	$\frac{9}{12}$
11	Carcinoma	Carcinoma	Tracheostomy	11	0	1 week	3	$1\frac{5}{12}$
24	Carcinoma	Carcinoma	—	24	2	2 days	$3\frac{8}{12}$	$\frac{9}{12}$
9	Carcinoma	Carcinoma	Radio-active iodine	—	3	$\frac{3}{12}$	$2\frac{11}{12}$	$1\frac{6}{12}$
4	Osseous metastases from thyroid carcinoma		Radio-active iodine	1	2	$\frac{4}{12}$	5	$2\frac{5}{12}$
1	,,	,,	Excision of metastasis	—	1	—	—	$\frac{7}{12}$
100				80	33			

CASE 8

A female patient aged 65 who had had a lump removed from the right side of the thyroid at 32, presented with fullness in the neck, dyspnoea, loss of voice, and pressure on the brachial plexus. Thyroidectomy was carried out. Histological examination of the thyroid revealed Hashimoto's disease.

The diagnosis is relatively easy when secondary deposits are the presenting feature, combined with the presence of a goitre or a history of recent thyroidectomy.

RESULTS OF TREATMENT

The results of treatment are shown in Table III. If a definite diagnosis of carcinoma can be made, it is said that it is too late to carry out treatment which can offer any hope of permanent cure. It is often too late to carry out the only operation which can prevent the lethal effects of local recurrence, i.e., total or hemi-thyroidectomy. In fact, total thyroidectomy was performed only twice in this series. The first patient, a man of 49, with an anaplastic growth, survived for nearly 5 years, before he died from mediastinal metastases. The second patient, a female aged 69, had an anaplastic carcinoma, and died of cerebral metastases 3 months after operation.

Hemi-thyroidectomy was carried out in 12 cases, and was followed by irradiation in all except two. Five of these patients, all under 50, are still alive from 2–5 years after operation. Local recurrence causing death from respiratory obstruction occurred in 2 patients. There was evidence of spread outside the gland in one case, and invasion of blood vessels and lymphatics in the other at the time of operation. Hemi-thyroidectomy combined with block dissection of the neck, was carried out on three occasions.

When radical surgery was impossible, treatment has varied from attempted total thyroidectomy, sub-total thyroidectomy, through partial removal for obstruction, to exploration and biopsy only, all with or without the addition of irradiation. In 5 cases a diagnosis of benign nodule or cyst was made pre-operatively, and removal of the nodule only was undertaken, (despite Crile's warning that if a thyroid nodule is considered dangerous enough to warrant removal it should be regarded as malignant, and therefore hemi-thyroidectomy should be performed rather than "shelling out," or local removal).[5] In fact these 5 patients are alive from 6 months to 6 years after treatment. Papillary carcinoma was found in each case.

Radiotherapy was the sole method of treatment in 24 patients, who had advanced inoperable cancer, 11 of them having glandular or pulmonary metastases at presentation. It is not surprising, therefore, that 10 were dead in 3 months. Radiotherapy alone had not been given to any operable cases in this series.

Thirty-five patients received tracer doses of radio-active iodine. In only 2 was there any evidence of uptake by the gland. One was a female aged 67, with a papillary type of growth, sub-total thyroidectomy was followed by a therapeutic dose of radio-active iodine. The patient became myoedematous, confirming the ablation of the gland. Tracer doses 2 years later failed to show functioning metastases. The patient is still alive, two years after treatment. The second patient, a female aged 58, with a follicular carcinoma, that had been partially removed, was treated by radio-active iodine. The growth recurred however, and the patient died 2 years later with widespread metastases. Radio-active iodine was given to 7 other patients after thyroidectomy, or exploration and biopsy, without affecting the course of the disease to much extent.

If the treatment of the primary growth with radio-active iodine in this series, has been disappointing, it has been remarkably successful in two cases with osseous metastases. These are the two cases referred to above, who presented with secondary deposits, one in the manubrium sterni (Case 1), the other in the lumbar and cervical spine (Case 3).

Correlation of the histological types of carcinoma of the thyroid to the results of treatment has not been attempted. The reason for this is that histological examination of all the tumours has not been carried out and classified by any one pathologist.

From the table it can be seen that 16 out of 17 patients in whom a clinical diagnosis of benign enlargement of the thyroid, or "possible carcinoma" was made, are alive from 6 months to 6 years after treatment. Only 8 out of 70 patients in whom a definite clinical diagnosis of carcinoma was made are still alive.

METASTASES

Metastatic deposits in bone which were the presenting feature in 5 patients, appeared later in a further seven. They appeared in the clavicle, manubrium sterni, skull, ribs,

vertebrae, pelvis and femur. The primary lesion was follicular or anaplastic. In this series no osseous deposits from a papillary type of primary growth were found.

Enlarged cervical lymph nodes were felt in 20 cases at presentation and appeared later in further 7. The type of growth in these cases was mainly anaplastic or papillary.

Metastases, mainly from anaplastic growths, were found in the lungs in 14 cases. Deposits in the liver and brain were also encountered.

In summary, papillary carcinoma metastasised mainly to regional lymph glands, and soft tissue organs, but never to bone, follicular tumours metastasised mainly to bone and soft tissues. Anaplastic growths spread to all structures.

MODE OF DEATH

The commonest mode of death was respiratory obstruction from recurrent or uncontrolled growth. The mechanism appears to be either narrowing of the trachea, causing death by asphyxiation, or perforation, associated with haemorrhage, bronchopneumonia following due to aspirated blood and growth. The next most frequent causes were cachexia associated with multiple metastases, followed by death from pulmonary deposits.

SUMMARY

1. One hundred cases of Thyroid cancer have been reviewed.
2. The ratio of females to males was 4 to 1.
3. In only 25 per cent of patients, was there pre-existing goitre.
4. Early diagnosis proved difficult, and therefore radical surgery was rare.
5. Occasionally there was difficulty in diagnosing the apparently late case.
6. The commonest mode of death is respiratory obstruction.
7. The 3 year survival rate under the age of 50 was 40 per cent, it was only 20 per cent over the age of 50.
8. The five year survival rate of treated cases from 1945–1950 in the South-West Region is 26 per cent.
9. The prognosis is bad if a definite diagnosis of carcinoma can be made on clinical examination, conversely the prognosis is relatively good if a mistaken diagnosis of benign goitre, or "possible carcinoma" is made.

I wish to acknowledge the help of Professor R. Milnes-Walker, at whose suggestion this review was carried out, the help of Dr. R. C. Tudway, who made available the notes of the patients treated at the Bristol General Hospital, and the permission of those surgeons in the South-West Region under whose care the patients were admitted.

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KYPHOSCOLIOSIS WITH PULMONARY HYPERTENSION

(A Clinical Pathological Conference of the University of Bristol Medical School)

CHAIRMAN: PROFESSOR T. F. HEWER

Professor Perry: This man came to the out-patient department on the 5th March, 1957. He was 48, an industrial chemist working for a firm near Bristol. Three weeks earlier he had noticed rapidly increasing dyspnoea on effort and, for a few days, substernal effort pain.

His previous history is that he had a severe spinal kyphoscoliosis, said to be postural in origin, since childhood. He had visited an orthopaedic surgeon at the age of ten. He had it therefore for at least 38 years. At the age of 22 he had an illness which he was told was lung trouble. He did not remember much about it. At the age of 37 he was an in-patient in the Royal United Hospital, Bath, with a duodenal ulcer which responded well to treatment. Twelve months ago he had a cough for three days and coughed up reddish brown sputum. His doctor sent him to have an X-ray and he was told the X-ray revealed no abnormality, but I do not see how a satisfactory X-ray could have been taken in view of the spinal deformity. During the summer of 1956, he had been playing tennis, family tennis—not Wimbledon Standard. (Laughter.) The family history is that his mother and father are alive and well and in their seventies.

On examination he had very severe kyphoscoliosis. He was cyanosed and had extreme orthopnoea. He could not attempt to lie down. The neck veins were engorged. The liver was enlarged below the costal margin. The heart was in normal rhythm. Blood pressure examination showed a small pulse pressure, 120/90. It was difficult to feel the apex beat or to hear the heart sounds because of the deformity. There were rales over both lung bases. The E.C.G. showed severe right ventricular preponderance and right ventricular strain. He was then in severe congestive heart failure and I arranged for his admission as soon as possible.

He was admitted two days later. The position was much the same, except that he was worse. He was treated initially with digoxin, without response. After two days this was stopped because we wondered if it was the right thing to do. Mersalyl and ammonium chloride were started. He did not respond to treatment. He died ten days after I first saw him and eight days after admission.

The clinical diagnosis was kypho-scoliotic heart disease, one of the first descriptions of which in the English literature was made by Carey Coombs in the *British Journal of Surgery* in 1930. He described four cases which followed the pattern of this man very closely.

Coombs suggested that there might be three possible causal factors of the heart failure:—

(1) The kinking of the thoracic aorta through its clinging too faithfully to the deformed spine (first described by Morgagni).

(2) Inadequate air space in the lungs.

(3) Restriction of the diaphragmatic excursion.

If the first theory is correct it is difficult to explain the marked right ventricular hypertrophy which is always present, but it would fit in with the clinical onset with severe rapidly increasing dyspnoea. The present view is that, in fact, the condition is a form of "cor pulmonale" resulting from the interference with pulmonary function, but the onset of symptoms with dyspnoea remains a puzzle to me. In 1930 the concept of pulmonary hypertension was hardly born but possibly this may develop in these people, perhaps from long continued anoxia and give rise to right ventricular hypertrophy and failure. If this theory is correct it might be a bad thing to treat these cases with digoxin and that was why it was stopped when there was no immediate response.

Dr. Sutton: Was there any record of tachycardia?

Professor Perry: His heart rate in hospital ranged from 90 to 100 and it was in normal rhythm.

Dr. Johnson: The body of this man was well nourished. There was moderately severe oedema of legs and back and severe cyanosis. There was no finger clubbing. There was a severe kyphoscoliosis convex to the right and I have no information to offer as to the cause. There was no evidence of anterior poliomyelitis or of tuberculous caries of the spine. Histological section shows only a little sclerotic buttressing along the concave border. The bodies of the other thoracic vertebrae are normal.

Because of this deformity the lungs were remarkably small and mis-shapen. On section the parenchyma was normal but I was immediately struck by the severe dilatation of the pulmonary artery and its first branches and the moderate atheroma that they showed. There was no disease of the lung parenchyma itself, only of the pulmonary vessels.

A histological section shows normal lung parenchyma, the only change being in the vessels. There is a fair degree of atheromatous thickening of these hypertrophied branches of the pulmonary artery. Apart from this and their small size the lungs were essentially normal.

Because of the kyphoscoliosis the position of the heart was abnormal. The long axis lay transversely across the body. There was kinking of the aorta where it fitted into the concave side of the thoracic curve. There was well-marked right-sided cardiac hypertrophy. Comparison of muscle fibres taken from similar sites shows that those from the right ventricle wall are two or three times the diameter of those from the left and the left ventricle is normal.

Other abnormal findings were a number of small subacute ulcers on the lesser curve of the stomach and one small healed chronic ulcer. There was also a mild degree of cerebral oedema.

I think there are two main problems in this case; one has been indicated to you by Professor Perry. The other is the association of gastric ulceration with right-sided heart failure. The first problem is why severe kyphoscoliosis causes right ventricular hypertrophy and heart failure. To give some indication of the position of this problem I have prepared a table showing conditions associated with pulmonary hypertension abstracted from the last 2,000 post-mortems performed in this Department. In the last 6 years we have had three cases in which there has been kyphoscoliosis with marked right ventricular hypertrophy and right-sided heart failure has been the cause of death.

Cause of right ventricular hypertrophy in 88 cases out of 2,000 post-mortems (22.11.50–8.8.56).

Chronic lung infection, emphysema or pneumokoniosis	55
Rheumatic valvular disease (mitral stenosis)	13
Congenital heart disease	8
Following left ventricular failure due to hypertension, calcific aortic disease or coronary infarction	6
Severe kyphoscoliosis	3
Multiple pulmonary embolism	1
Muscular dystrophy	1
Tumour of left atrium (pseudo-myxoma)	1

This, therefore, was a man with kyphoscoliosis, the cause of which is not apparent. There is quite a large group in which there is no obvious cause and these are often described as postural. He developed right ventricular hypertrophy without any gross intrinsic lung disease and he suddenly went into failure and died.

Professor Perry: I wonder if Dr. Johnson could tell us how kinked the aorta was and whether there was any fibrosis around the root of the pulmonary artery as described in one of Coombs' cases.

Dr. Johnson: I was very struck by the lack of any obvious mechanical factor which could have given rise to the pulmonary hypertension. I am convinced that there was no serious kinking of the aorta; if there had been aortic obstruction one would expect left-sided cardiac hypertrophy. It is difficult to believe that there might have been any kinking of the pulmonary veins; if this had been present one would expect chronic pulmonary congestion. The lungs were normal apart from the changes of pulmonary hypertension.

Dr. Sutton: What about the pulmonary arterioles?

Dr. Johnson: The degree of arteriolar hypertrophy is difficult to assess exactly. They are thick-walled.

Dr. Sutton: Is there any question of devascularisation at capillary level?

Dr. Johnson: There was no evidence of endarteritis or any destruction of the capillary bed.

There is a perfectly good hypothesis to account for this condition. In normal people on exercise there is a fall in the diastolic pressure in the pulmonary circulation so that in actual fact the work done by the right heart, which determines the mass of the muscle in it, changes negligibly. If, on the other hand, you take people with any of these lung diseases, pulmonary emphysema, for example, and give them increased work, the pressure, both diastolic and systolic, rises and the work of the right heart increases. Whereas in normal people the increase may be only 10 per cent, in people with emphysema the pulmonary pressure may double or even treble. This may tie in with the degree of oxygenation of the blood. In the normal if the concentration of oxygen in inspired air is reduced to half there is a very considerable rise in the pulmonary arterial pressure, and it appears possible that in this man with poor lung movements because of his kyphoscoliosis, deficient oxygenation of the blood leads to depression of the normal reflexes which should result in dilatation of the pulmonary circulation during exercise. This seems to be the first stage. Vascular changes appear and a vicious circle occurs until there is increased pulmonary arterial pressure even at rest.

Professor Perry: I think your theory may be right but I would put it the other way: that deficient oxygenation of the blood and chronic anoxia may give rise to increased tone in the pulmonary arterioles—pulmonary hypertension. I am still puzzled why these people get rapidly increasing dyspnoea first and yet on post-mortem you say this man's lungs were dry.

Dr. Johnson: Their dyspnoea is due to decreased vital capacity.

Professor Perry: Then why does the dyspnoea suddenly increase rapidly in intensity? Was there any evidence of recent chest infection?

Dr. Johnson: These lungs are quite normal lungs. There is no fibrosis nor evidence of any recent pulmonary infection.

Professor Hewer: Dr. Johnson showed us a section of the vertebra with the kink and there is some sclerosis of the bone and nothing else to explain the kyphoscoliosis at all. I have always thought the postural hypothesis for kyphoscoliosis is a very poor argument.

I have brought from the museum a specimen of the whole trachea of a man of 20 who was a hunchback as a result of Pott's disease. He had tuberculous caries of the spine when he was six and died after about 48 hours of influenza during an outbreak in 1940. He had been very subject to coughs and colds and was absolutely blue. The length of his trachea was only 9 cm. and this is an indication of the degree of deformity in his case. He died of asphyxia because of accumulation of mucus in his bronchi and pulmonary collapse.

I suggest that the chief problem needing investigation is the true mechanism of production of kyphoscoliosis in childhood in the absence of Pott's disease or poliomyelitis. I find it hard to believe that adopting a bad posture could possibly cause it.

Professor Perry: I do agree with you about wanting to know the cause of kyphoscoliosis. In fact, Coombs justified his publishing the record of his four cases in the

British Journal of Surgery as follows: "Whatever the explanation it is clear that there is a real danger of untimely death from cardiac failure in the victims of angular deformity of the spine, and it is by way of affording to the orthopaedic surgeon an added reason for attempting to prevent that deformity that this note was written."

Professor Hewer: I think Dr. Coombs reported two cases in one family with idiopathic kyphoscoliosis. Were both of these attributed to faulty posture?

Professor Perry: Yes, Case 4 whose brother had been similarly deformed and died of heart failure. There was no post-mortem but there was no known cause for the kyphoscoliosis.

I do not believe that spinal deformity is as common as it used to be. Has the medical inspection of schoolchildren and so-called remedial exercises done any good?

Professor Neale: Not a bit.

Dr. Sutton: These so-called postural deformities occur in children with malnutrition. They are sub-rachitic.

Professor Neale: If you put them in a medical support or even a metal cage they will still develop kyphoscoliosis and bend the steel. (Laughter.)

Dr. Gaskell. With regard to the spine I would like to enquire from Dr. Johnson whether there was a primary cervical curve above the dorsal kyphosis?

At Frenchay Hospital we have quite frequently seen cervical cord or nerve-root compression developing in early middle-age where there was a primary cervical anomaly of Klippel-Feil type (and secondary dorsal kyphoscoliosis). Such cases are notorious "anaesthetic risks" due both to the rigid thorax and reduced phrenic innervation. These factors could be operative in the case under discussion.

Dr. Johnson: There was a curve in the cervical region, but not more than we would have expected. There was no defect at the base of the skull, nor obvious cord compression in the cervical area.

(*Addendum by Dr. Johnson:* One feature of this case which escaped discussion during the conference was the coincidental gastric ulceration. The incidence of subacute or chronic gastric ulceration in the 88 cases of pulmonary hypertension in the above table is 11·4 per cent (ten cases) and of acute ulceration 5·7 per cent (5 cases). This compares with 3·8 per cent, 0·7 per cent and 1·8 per cent for chronic subacute and acute gastric ulceration respectively in the whole series of 2,000 autopsies. There is no evidence of increased incidence of gastric ulceration, other than erosions, in passive systemic congestion from the figures of the extensive German literature and the possible neuro-vascular background to both pulmonary hypertension and gastric ulceration opens an interesting line of speculation.)

REFERENCES

Coombs, Carey F. (1930). *Brit. J. Surg.*, **18**, 326–328.

Correspondence

DEAR SIR,

I would like to express my appreciation of Professor Bruce Perry's lecture on the medical curriculum; it was so full of good sense. Many of us in General Practice are interested in medical education, and about a year or so ago two senior medical students were invited to address the Bristol South Medical Group on that subject. I was interested to learn that matters were very little different from my student days, indeed to all the "ologies" we had to cope with 25 years ago many more have been added, as Professor Bruce Perry put it there has been no change only more overloading.

What surprises me most and, as he admitted, puzzled him too is that, despite the wealth of writing on the subject over the past years, very little has been achieved in the way of reforming the curriculum and easing the burden of the student. Of course it may well be that in the teaching hospitals and universities there are difficulties to contend with just as we have, people who are impervious to new ideas and extremely resistant to the suggestion that there might after all be better ways of teaching students.

I liked the reference to the American tutorial system whereby discussion rather than lectures is the method of imparting clinical experience but this he thought impossible here because of staff difficulties. In my clinical days in Glasgow each teaching unit at the Western Infirmary had on its staff one or two G.P.'s in practice in the City who attended several mornings a week to act as tutors, and this worked very well in practice.

The G.P. student training scheme has been in operation in Bristol now for some years and is much appreciated by the students, but I feel it is inadequate and applied far too late in the curriculum; we could do far more to our mutual benefit. I think it is true to say that after some years experience in the practice of the art and science of medicine our attitude to our patients is conditioned very largely by the atmosphere in which we work. Up until quite recently medical students have been instructed almost exclusively by teachers whose clinical experience has for the most part been gained in hospital dealing with patients referred there by General Practitioners. Surely the General Practitioner with his experience derived from being the first to see the patient and deal with him in the background of his home and working condition has a part to play in a reformed medical curriculum.

Yours sincerely,

JOSEPH SLUGLETT.

Notes and News

Mr. W. M. Capper, M.B. (Lond.), F.R.C.S., M.R.C.O.G., has been elected a member of the court of examiners of the Royal College of Surgeons of England.

Mr. Keith Chitty, B.A., M.B. (Camb.), F.R.C.S., has been appointed consultant surgeon, Mid-Worcestershire group of hospitals.

Mr. P. C. Watson, M.B. (Lond.), F.R.C.S. has been appointed consultant general surgeon, Boston area hospitals.

EXAMINATION RESULTS

L.R.C.P., M.R.C.S.: V. P. Nagpal.

UNIVERSITY OF BRISTOL

M.B., Ch.B.

DECEMBER 1957

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Addy, M. G.	Gibbins, R. R.	Roper, K. J.
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Codd, A. A.	Lartey, O.	Weeks, R. F.
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Edmondson, J. S.		

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Receipts for Subscriptions.

In future when subscriptions to the Society are paid by cheque the Hon. Treasurer will send no receipt for subscriptions, unless a receipt is specifically asked for.

The step is covered by the Cheque Act, 1957, Section 3, which provides that even an unendorsed cheque which appears to have been paid is evidence of receipt.

In this way, the Society will be saved over £7 0s. 0d. a year in postage alone.

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MISS M. C. HOLDERNESS, M.B., CH.B.	Registrar in Anaesthetics.	S.H.O., Southmead Hospital.
A. R. BOLLEN, M.B., CH.B.	Registrar in Anaesthetics.	Registrar, Royal United Hospital, Bath.
D. R. COLES, M.D., CH.B., B.SC.	Hon. Registrar in Medicine and Research Fellow.	

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JANCAR, J., M.B., B.CH., B.A.O. (N.U.I.), D.P.M.	Assistant Psychiatrist, Stoke Park Hospital Group.	Junior Hospital Medical Officer Stoke Park Hospital.
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WARBOYS, J. W., M.D. (SHEFFIELD), D.P.M.	Consultant Psychiatrist, Tone Vale Hospital, near Taunton.	Assistant Psychiatrist, Middlewood Hospital, Sheffield: Physician i/c E.E.G. Dept., Sheffield Royal Infirmary.
COLLINS, W. J. H., M.B., B.CH., B.A.O., D.P.M.	Senior Psychiatric Registrar, Tone Vale Hospital, near Taunton.	Locum S.H.M.O., Warley Hospital, Brentwood.

DEVON AND CORNWALL

JOHN, H. T., M.B., B.S. (DURHAM), F.R.C.S. (ENGLAND)	Senior Surgical Registrar, Royal Devon and Exeter Hospital, Exeter (joint appt. with the United Bristol Hospitals).	Surgical Registrar, University College Hospital.
HACKETT, A. H., M.B., CH.B. (OTAGO, N.Z.).	Surgical Registrar, South Devon and East Cornwall Hospital, Plymouth.	S.H.O. in Traumatic Surgery, Birmingham Accident Hospital.
MCGHIE, J. A., M.B., CH.B. (EDINBURGH), M.R.C.O.G.	Clinical Assistant in Obstetrics and Gynaecology undertaking eight sessions in the Torquay Group of Hospitals.	Locum Registrar, Royal Devon and Exeter Hospital.
EVANS, JILL M., M.B., B.CH. (CAMBRIDGE), D.R.C.O.G.	Registrar in Obstetrics and Gynaecology, Royal Devon and Exeter Hospital, Exeter.	S.H.O., Pembury Hospital, Kent.